

ASSESSMENT OF RADON ASSOCIATED LIFETIME RISK IN SUPPORT TO RADIATION PROTECTION

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Background and aims: Quantification of radon associated lung cancer risk is a major public health issue. Many epidemiological studies provided results on the exposure-risk relationship in miners or in the general population. Nevertheless, due to variations in the study designs, in the characteristics of the studied populations and in factors that modify the exposure-risk relationship, it is difficult to verify the coherence of published results. We present here calculations of lifetime excess absolute risks (LEAR) to compare the results of models derived from different populations when applied to the same scenario of exposure.

Methods: Models derived from pooled miner studies and pooled indoor studies were applied. Background rates were those proposed by the International Commission for Radiation Protection (ICRP). Different scenarios of chronic low rate exposure were considered. A sensitivity analysis was performed to evaluate the impact of methodological choices (model, background rate, lifetime duration...).

Results: Based on the BEIR VI model and the Czech-French model, a LEAR of about $5 \cdot 10^{-4}$ per Working Level Month (WLM) was derived. This estimate has to be compared with the value of $2.8 \cdot 10^{-4}$ per WLM published in 1993 in the ICRP Publication 65. The sensitivity analysis showed that the estimated LEAR vary from 3 to $7 \cdot 10^{-4}$ per WLM according to the model used. Calculations also illustrated the sensitivity of LEAR estimates to background rates. When applied to adapted scenarios, LEAR estimates obtained from miners and from indoor studies were different for less than 30%.

Conclusions: LEAR estimates based on recent models derived from pooled analyses of miner data are higher than the one previously considered by the ICRP. Calculations demonstrate a good consistency between lung cancer risk estimates obtained from miners or indoor studies. These results provide support to the elaboration of radiation protection measures regarding radon exposure.